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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/777,403	02/13/2004	Klaus Bohnert	004501-718	5778

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EXAMINER

KIANNI, KAVEH C

ART UNIT PAPER NUMBER

2883

DATE MAILED: 06/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/777,403

Applicant(s)

BOHNERT ET AL.

Examiner

Kianni C. Kaveh

Art Unit

2883



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) 12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2 and 10 is/are rejected.
- 7) ☒ Claim(s) 1-9 and 11 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 5.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

- Applicant's election with traverse of claims in response/amendment submitted on 3/14/05 is acknowledged. The traversal is on the ground(s) that search and the examination of the entire application can be made without serious burden. This is not found persuasive because the product of claim 1, invention I, has at least one limitation such as N sensor heads that can be arranged in the shape of a coil around current conductors or along the magnetic field, at least one phase modulation unit to a fiber optic sensor including control and evaluation unit that is connected via at least one detector signal line to the at least one detector and via at least one modulator signal line to the at least one phase modulator, while the process of claim 12, invention II, involves N sensor heads in which the lightwaves undergo a phase shift, which phase shift depends on the current or magnetic field to be measured. Furthermore, in the instant case invention I can be used as wavelength and/or current detection sensor in an optical communication system rather than mere current or magnetic measuring unit. Thus, the search required for invention I is different than that of required for invention II and therefore the requirement is still deemed proper and is therefore made FINAL.

Specification

The disclosure, including abstract is objected to because of the following informalities: the parameters p_0, q_0, z_0 need to be corrected to p, q, z since p_0, q_0, z_0 are not defined in the specification. Appropriate correction is required.

The abstract filed is objected to as not being presented as a single paragraph.

Appropriate correction is required.

The abstract contains non-relevant, to abstract, characters at top right and at the bottom right of the abstract sheet that need to be erased. Appropriate correction is required.

Claim Objections

Claims 1 and 2 are objected to because of the following informalities: in the 26th -27th lines of the claim1 and last line of claim 2, the parameters po ,qo , zo need to be corrected to p ,q , z since po ,qo, zo are not defined in the preceding limitations no in the specification. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1 recites the limitation 'it holds'... in line 6 of page 3, claim 1. There is insufficient antecedent basis for this limitation in which such limitation is confusing as what limitation exactly the applicant is referring to. Correction is required.

Allowable Subject Matter

Claims 3-9 and 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 3-5 are allowable because the prior art of record, taken alone or in combination, fails to disclose or render obvious exactly one phase modulation unit (PME) is provided, and in that N reflection interferometers are provided, each of the N reflection interferometers including exactly one of the N sensor heads and the N sensor heads in each case having a mirrored end in combination with the rest of the limitations of the base claim.

Claims 6-8 are allowable because the prior art of record, taken alone or in combination, fails to disclose or render obvious each of the phase modulators being connected to the control and evaluation unit via one modulator signal line each in combination with the rest of the limitations of the base claim.

Claim 9 is allowable because the prior art of record, taken alone or in combination, fails to disclose or render obvious amplitudes of the modulation of the differential phase of the linearly polarized lightwaves lie between 1.7 and 2.0, in particular between 1.8 and 1.88, or are essentially 1.84 for all n with $1 \leq n \leq N$ in combination with the rest of the limitations of the base claim.

Claim 11 is allowable because the prior art of record, taken alone or in combination, fails to disclose or render obvious that N=3 or N=6, and the electric currents of three

phases of an electric high voltage system can be measured by means of one sensor head each in the case of N=3, or being able to be measured by means of two sensor heads each in the case of N=6 in combination with the rest of the limitations of the base claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

- This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-2 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over combination of Bennett (US 6542651) and Bennett et al. (US 6563589).

Regarding claims 1 and 2, Bennett ('2651) teaches a fiberoptic sensor for measuring at least one electric current or magnetic field (see at least col. 1, 1st parag.), having a light source 18/19, sensor head 22 that can be arranged in the shape of a coil around current conductors or along the magnetic field (see at least fig. 9, item 18 and 22, and col. 1, 1st parag.), at least one phase modulation unit having at least one

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phase modulator 25, at least one detector 32, and a control and evaluation unit 90 that is connected via at least one detector signal line to the at least one detector 32, and via at least one modulator signal line (see at least fig. 9, item modulated lines coupling various items) to the at least one phase modulator 25;

first means/fiber being provided for guiding light from the light source 18/19 into an end 20, on the detector side, of the phase modulation unit 25,

second means/fiber being available for guiding light from the end 20, on the detector side, of the phase modulation unit to the detector 32,

the at least one phase modulation unit 20 having a further end, on the sensor head 22 side, that is optically connected to at least one sensor head 22, and

wherein by means of the at least one phase modulation unit 56a linearly polarized lightwaves can be phase-modulated differentially in a non-reciprocal fashion (see at least fig. 5-6, item 56a differentially phase modulates polarized signals coming from sample and hold 50 through 37), characterized in that N modulation amplitudes $\Phi_{0,n}$ and N modulation frequencies are provided for the non-reciprocal differential phase modulations (see at least col. 7, last parag.+), the modulation frequencies and two prescribable positive whole numbers p, q with $p \neq q$ being selected in such a way that it holds for all positive whole numbers z and for all whole numbers n, m with $n \neq m$ and $1 \leq n, m \leq N$ that: $p\nu_n \neq q\nu_m$ (although the examiner does not give patentable weight for 'prescribable positive whole numbers' such as p, q, since such limitation is a functional language, rather than a means for performing a function, and because any given number can be prescribable to a system sensor, nevertheless, see these limitations on

figures 2-3, item whole positive numbers 2 and 10, as whole two positive numbers p and q in ranges positive whole numbers 1-10, z , for all whole odd numbers n and even numbers m that in holds true in above equation for specified frequency range frequencies v_n, v_m such that $p v_n \neq z v_m$), and the modulation amplitudes and modulation frequencies being selected as a function of modulation-relevant optical path lengths (see at least fig. 5/8/11, item fiber coiled length as also delay line and col. 8, 4th prag.).

However, in the above embodiment Bennett does not specifically teach wherein the above optical sensor head is N sensor heads with $N \geq 2$ and signals that are originate from the various sensor heads and are fed to the control and evaluation unit can be distinguished from one another by means of frequency filtering to determine the output signals for each n , between 1 and N , from signals at the frequencies $p v$ and $q v$ in the control and evaluation unit. These limitation are more specifically taught by Bennett et al. (see at least col. 6, line 65-col. 7, line 18). Thus Bennett et al. provides accurately measurable means for current sensors and signal processing electronics (see col. 1, line 15-26). Thus, it would have been obvious to a person of ordinary skill in the art when the invention was made to combine the teachings of both Bennett and Bennett et al. by replace the above sensor head of Bennett with that of N sensor heads of Bennett et al. including frequency filtering, in order to produce a sensing system that includes the above limitations, since the teachings of Bennett and Bennett et al. are compatible and since such configuration of sensor heads would measure magnetic fields (see col. 1, 2nd col.), and electric current (col. 1, line 35).

Regarding claims 10, as stated in rejection of claim 1, above, Benntt further teaches either (a) exactly one detector (2) is provided, or (b) N detectors are provided, each of the detectors being connected to the control and evaluation unit via one detector signal line each *see at least fig. 10, items 32, 34).

Citation of Relevant Prior Art

Prior art made of record and not relied upon is considered pertinent to applicant's disclosure. In accordance with MPEP 707.05 the following references are pertinent in rejection of this application since they provide substantially the same information disclosure as this patent does. These references are:

Bennett 6763153

Bennett 6563589

Kleinerman 5991479

Tatam 5450006

Amtmann et al. EP 1139105 A2

These references are cited herein to show the relevance of the apparatus/methods taught within these references as prior art.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to K. Cyrus Kianni whose telephone number is (571) 272-2417.

The examiner can normally be reached on Monday through Friday from 8:30 a.m. to 6:00 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font, can be reached at (571) 272-2415.

Any response to this action should be mailed to:

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Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 872-9306 (for formal communications intended for entry)

or:

Hand delivered responses should be brought to Crystal Plaza 4, 2021 South
Clark Place, Arlington, VA., Fourth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application should be
directed to the Group Receptionist whose telephone number is (703) 308-0956.

A handwritten signature in black ink, appearing to read 'K. Cyrus Kianni', with a long horizontal flourish extending to the right.

K. Cyrus Kianni
Patent Examiner
Group Art Unit 2883

May 17, 2005